

LEVEL II

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PRESENTATION TO THE  
THE SIXTEENTH ANNUAL  
DEPARTMENT OF DEFENSE COST ANALYSIS SYMPOSIUM

TITLE: ACQUISITION COST/PRICE ESTIMATING

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USAAVRADCOM

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October 1981

## INTRODUCTION

VC #1

USAAVRADCOM HAS AN AUTHORIZED MANPOWER LEVEL OF OVER 2000 AND AN ANNUAL OPERATING BUDGET OF APPROXIMATELY \$800 MILLION WITH THE ASSIGNED MISSION OF CONDUCTING AND MANAGING RESEARCH, DEVELOPMENT AND ACQUISITION OF US ARMY AVIATION AIRCRAFT SYSTEMS. FUNCTIONALLY, THE COMMAND PLANS, DIRECTS, ACCOMPLISHES AND SUPERVISES THE DESIGN, DEVELOPMENT AND MAJOR MODIFICATION OF AIRCRAFT SYSTEMS, AND SUBSYSTEMS AND PROVIDES FULL TECHNICAL AND ADMINISTRATIVE SUPPORT TO PROJECT MANAGEMENT OFFICES. ITS ASSIGNED AERONAUTICAL MATERIEL INCLUDES BOTH FIXED AND ROTARY WING AIRCRAFT SYSTEMS, DRONES, GROUND SUPPORT DEVICES AND ANCILLARY EQUIPMENT AND AIRBORNE COMMUNICATION SYSTEMS. WE HAVE LABORATORIES CO-LOCATED WITH NASA DESIGN/TEST FACILITIES AT THREE OTHER LOCATIONS AND OUR PROGRAMS ARE INTERNATIONAL IN SCOPE, INVOLVE MAJOR AND HIGHLY DYNAMIC ADVANCES IN TECHNOLOGIES, HAVE SIGNIFICANT IMPACT ON INDUSTRY, AND ARE ESSENTIAL TO THE TOTAL DEFENSE POSTURE.

### MISSION AND FUNCTIONS:

- a. AVRADCOM IS THE DARCOM LEAD COMMAND FOR CURRENT AND FUTURE ARMY AVIATION RELATED RESEARCH DEVELOPMENTS, AND INITIAL PROCUREMENT. WHILE AVRADCOM HEADQUARTERS IS IN ST. LOUIS, MISSOURI, AVRADCOM ACTIVITIES ARE LOCATED THROUGHOUT THE UNITED STATES.
- b. THE AVRADCOM ORGANIZATION INCLUDES THE PROPULSION, STRUCTURES, AEROMECHANICS, AVIONICS, AND APPLIED TECHNICAL LABORATORIES: A FLIGHT TEST ACTIVITY AND; ARMY PLANT REPRESENTATIVE OFFICES AT BOEING VERTOL, BELL HELICOPTER TEXTRON, AND HUGHES HELICOPTERS, INC. PROJECT MANAGERS FOR THE CH-47 MODERNIZATION, THE ARMY HELICOPTER IMPROVEMENT PROGRAM, THE REMOTELY PILOTED VEHICLE, AND THE AIRCRAFT SURVIVABILITY EQUIPMENT ARE LOCATED WITH THE AVRADCOM HEADQUARTERS IN ST. LOUIS. WHILE THE PMs FOR THE ADVANCED ATTACK HELICOPTER AND THE BLACK HAWK ARE UNDER THE DIRECT CONTROL OF HQ DARCOM, THEY

ARE CO-LOCATED WITH HQ AVRADCOM FOR ADMINISTRATIVE SUPPORT.

WORKFORCE: PROFESSIONALS, PREDOMINATELY IN THE SCIENTIFIC AND ENGINEERING FIELDS ALONG WITH ADMINISTRATIVE AND TECHNICAL PERSONNEL, COMPRISE THE AVRADCOM WORKFORCE.

MY JOB: AS THE DIRECTOR OF PLANS AND ANALYSIS, (60 PERSONNEL), I MANAGE THE COMMAND'S OPERATIONS RESEARCH/SYSTEMS ANALYSIS (ORSA) AND COST ANALYSIS/ESTIMATING ACTIVITIES WITH A PRIMARY CONCENTRATION ON THE ACQUISITION OF MILITARY HARDWARE (INCLUDING NATO-ORIENTED ANALYTICAL STUDY EFFORTS). I AM RESPONSIBLE FOR PROVIDING CONTROL, DIRECTION, GUIDANCE AND COORDINATION FOR THE COMMAND'S POLICY FORMULATION AND THE INTERPRETATION AND DEVELOPMENT OF COMMAND PLANS AND STAFF DIRECTION IN THE EXECUTION OF EMERGENCY AND MOBILIZATION PLANS. (THE DIRECTORATE ALSO SERVES AS THE COMMAND FOCAL POINT FOR RESPONSE TO HIGH COMMAND LEVEL SPECIAL STUDY REQUIREMENTS AS WELL AS FOR ALL ENVIRONMENTAL AND ENERGY PROGRAM MATTERS.

X THE WEAPONS SYSTEM ACQUISITION FUNCTION WITHIN THE ARMY HAS AS ITS PRINCIPAL FOCUS THE FIELDING OF THE BEST EQUIPMENT AT THE LOWEST POSSIBLE COST TO THE TAXPAYER. AT AVRADCOM, MAXIMIZING QUALITY AND MINIMIZING COST ARE TASKS UPON WHICH GREAT EFFORT IS EXPENDED.

THE SPECIFIC OBJECTIVES OF COST ANALYSIS IN SUPPORT OF THE MATERIEL ACQUISITION PROCESS INCLUDE IDENTIFYING AND SUMMARIZING THE EXPECTED TOTAL RESOURCE REQUIREMENTS OF MATERIEL SYSTEMS, RECOMMENDING COST GOALS FOR THOSE SYSTEMS, AND VALIDATING THOSE ESTIMATES THROUGH INDEPENDENT COSTING METHODS. INSTRUMENTS THROUGH WHICH SYSTEM COST ESTIMATES AND THEIR EVALUATION ARE DOCUMENTED ARE THE BASELINE COST ESTIMATE (BCE) PREPARED FOR ALL MAJOR WEAPON SYSTEMS AT EACH ARMY SYSTEM ACQUISITION REVIEW COUNCIL (ASARC) DECISION POINT, THE INDEPENDENT PARAMETRIC COST ESTIMATE (IPCE) PREPARED AS A VALIDATION FOR ALL BCE, AND A COST AND OPERATIONAL EFFECTIVENESS ANALYSIS (COEA) PREPARED AT EACH ASARC DECISION POINT.

THE BCE IS A GENERIC TERM DENOTING A COMPLETE, DETAILED AND FULLY DOCUMENTED ESTIMATE OF MATERIEL SYSTEM LIFE CYCLE COSTS ACCOMPLISHED BY THE MATERIEL SYSTEM PROJECT MANAGER.

IT IS A DYNAMIC DOCUMENT, APPROPRIATELY REFINED AND UPDATED THROUGHOUT THE ACQUISITION CYCLE. IT SERVES, AFTER REVIEW AND VALIDATION, AS THE PRINCIPAL COST ESTIMATE FOR THAT SYSTEM. THE BCE IS USED AS THE PRINCIPAL INSTITUTIONAL SOURCE DOCUMENT FOR COST INFORMATION RELATED TO THE MATERIEL SYSTEM INCLUDING DESIGN-TO-COST GOALS, THE BASIS FOR PROJECTING FUNDING REQUIREMENTS, THE BENCHMARK AND SOURCE FOR SYSTEM COST TRACKING, AND AS THE BASIS FOR COST INPUTS TO SUCH REPORTS AS THE SELECTED ACQUISITION REPORT (SAR).

BCE'S REFLECT A VARIETY OF COSTING APPROACHES. IF THE INITIAL BCE IS DEVELOPED PRIOR TO CONTRACTOR INVOLVEMENT IN THE PROGRAM, SYSTEM DESIGN WILL NOT BE WELL DEFINED AND WILL USUALLY PERMIT COSTING ONLY BY PARAMETRIC TECHNIQUES. AS SYSTEM DEFINITION IMPROVES AND CONTRACTOR PARTICIPATION INCREASES, BCE'S REFLECT INCREASING USE OF DETAILED ENGINEERING COST ESTIMATES.

THE CREATION OF RELIABLE COST ESTIMATES IS CONTINGENT UPON THE AVAILABILITY OF ACCURATE AND COMPLETE COST DATA ON SYSTEMS THAT HAVE BEEN PROCURED IN THE PAST. QUANTITATIVE MODELS THAT ARE USED TO PREDICT FUTURE SYSTEM COST ARE DEVELOPED USING PHYSICAL, PERFORMANCE, AND COST PARAMETERS OF SIMILAR SYSTEMS. THE ACCURACY OF THESE COST ESTIMATING RELATIONSHIPS, CERS, IS LARGELY A FUNCTION OF THE QUANTITY AND QUALITY OF DATA THAT IS AVAILABLE AT THE TIME OF FORMULATION. IN ORDER TO ENSURE THAT SUCH COST DATA ARE READILY AVAILABLE, THE DEPARTMENT OF THE ARMY PARTICIPATES FULLY IN THE DEPARTMENT OF DEFENSE DIRECTED SELECTED ACQUISITIONS INFORMATION AND MANAGEMENT SYSTEM (SAIMS) PROGRAMS FOR COLLECTING AND MAINTAINING COST RELATED INFORMATION, AS CONTAINED IN THE 7000 SERIES OF DODI.

THE SELECTED ACQUISITION INFORMATION AND MANAGEMENT SYSTEMS (SAIMS) ARE A SUB-SET OF THE DEPARTMENT OF DEFENSE RESOURCE MANAGEMENT SYSTEMS. THE REPORTS GENERATED THEREBY HAVE BEEN DISCUSSED PREVIOUSLY AS GOOD SOURCES OF DATA FOR COST ESTIMATING. THEIR PRIMARY FUNCTION, HOWEVER, IS TO PROVIDE THE ARMY WITH EARLY IDENTIFICATION OF

INCIPIENT OR POTENTIAL COST GROWTH AND/OR SCHEDULE SLIPPAGE SO THAT CORRECTIVE ACTION CAN BE TAKEN IN A TIMELY MANNER. CONTRACTOR REPORTING REQUIREMENTS ARE TAILORED TO THE ESSENTIAL MANAGEMENT NEEDS OF THE GOVERNMENT. IN ORDER TO ENSURE THAT ON MAJOR CONTRACTS WITH COST RISK, THE CONTRACTORS HAVE AN EFFECTIVE MANAGEMENT SYSTEM, AND CAN PROVIDE ACCURATE, USEFUL INFORMATION IN THEIR REPORTS, THE CONTRACTS REQUIRE THAT EACH CONTRACTOR'S INTERNAL SYSTEM FOR PLANNING AND CONTROLLING CONTRACT PERFORMANCE BE IN COMPLIANCE WITH THE CRITERIA CONTAINED IN DEPARTMENT OF DEFENSE INSTRUCTION 7000.2, PERFORMANCE MEASUREMENT FOR SELECTED ACQUISITIONS.

THE REPORTS GENERATED BY DESIGNATED CONTRACTORS ARE THE COST PERFORMANCE REPORT (CPR) WHICH IS INTENDED TO PROVIDE EARLY IDENTIFICATION OF PROBLEMS HAVING SIGNIFICANT COST IMPACT, EFFECTS OF MANAGEMENT ACTIONS TAKEN TO RESOLVE EXISTING PROBLEMS, AND PROGRAM STATUS INFORMATION FOR USE IN MAKING AND VALIDATING MANAGEMENT DECISIONS.

THE COST/SCHEDULE STATUS REPORT (C/SSR) WHICH IS INTENDED TO PROVIDE SUMMARIZED COST AND SCHEDULE PERFORMANCE STATUS INFORMATION ON CONTRACTS WHERE APPLICATION OF THE CPR IS NOT APPROPRIATE.

THE CONTRACT FUNDS STATUS REPORT (CFSR) WHICH IS INTENDED TO SUPPLY FUNDING DATA THAT, PROVIDES DOD MANAGEMENT WITH INFORMATION FOR: (1) UPDATING AND FORECASTING CONTRACT FUND REQUIREMENTS, (2) PLANNING AND DECISION-MAKING ON FUNDING CHANGES, (3) DEVELOPING FUND REQUIREMENTS AND BUDGET ESTIMATES IN SUPPORT OF APPROVED PROGRAMS, AND (4) DETERMINING FUNDS IN EXCESS OF CONTRACT NEEDS AND AVAILABLE FOR DEOBLIGATION.

THE SELECTED ACQUISITION REPORT (SAR) IS A STANDARD, COMPREHENSIVE, SUMMARY STATUS REPORT ON MAJOR DEFENSE SYSTEMS SELECTED FOR SPECIAL MANAGEMENT WITHIN THE DOD AND IS SUBMITTED BY PROJECT MANAGERS.

THEY ARE PRODUCED QUARTERLY AND CONTAIN CURRENT ESTIMATED TECHNICAL, SCHEDULE, QUANTITY AND SELECTED PORTIONS OF SYSTEM LIFE CYCLE COST INFORMATION FOR SPECIFIED DOD MATERIEL SYSTEMS.

THE REPORTS ARE PREPARED BY PROJECT MANAGERS FROM PROGRAM SOURCE DOCUMENTS SUCH AS DEVELOPMENT PLANS, DECISION COORDINATING PAPERS, CURRENT BASELINE COST ESTIMATES, COST PERFORMANCE REPORTS SUBMITTED BY THE CONTRACTORS, ETC. THEY ARE THEN SUBMITTED THROUGH COMMAND CHANNELS TO HQDA. A CONTINUING TRACK OF THE REPORTABLE COSTS IS MADE TO THE PLANNING (OR DEVELOPMENT) ESTIMATE RECORDED FOR THAT SYSTEM AND VARIANCES FROM THAT ESTIMATE ARE EXPLAINED.

IT SHOULD BE NOTED THAT OPM DOES NOT PROVIDE AN OCCUPATIONAL SERIES ENTITLED EITHER "COST ANALYST" OR "PRICE ANALYST." AT AVRADCOM, HOWEVER, THE TERM "COST ANALYST" IS APPLIED TO PERSONNEL WORKING EITHER IN THE DIRECTORATE FOR PLANS AND ANALYSIS OR SEVERAL OF THE PROJECT MANAGER'S OFFICES. THEIR OCCUPATIONAL SERIES IS MOST TYPICALLY ORA, BUT SOME ARE ENGINEERS, STATISTICIANS, ECONOMISTS, ETC. THE "PRICE ANALYST" IS FOUND ONLY IN THE DIRECTORATE FOR PROCUREMENT AND PRODUCTION. THESE PERSONNEL USUALLY ARE IN THE OCCUPATIONAL SERIES OF PROGRAM ANALYST, ALTHOUGH SOME ARE ACCOUNTANTS AND SOME ARE IN SOME OTHER SERIES.

VG#3 (STUDY OF ANALYTICAL FUNCTIONS)



VG #3 A. STUDY OF ANALYTICAL FUNCTIONS: (APPROACH TO TASK)

B. OVERALL CONCEPT OF COST ANALYSIS

BROADLY, COST ANALYSIS REFERS TO THE DETERMINATION OF THE PROBABLE ECONOMIC RESOURCE IMPACT OF FUTURE MILITARY WEAPON AND SUPPORT SYSTEMS. RESOURCE IMPACT SIMPLY MEANS THE COST TO THE (NATIONAL) ECONOMY OF DEVELOPING, INSTALLING, AND OPERATING MILITARY SYSTEMS AND FORCES REQUIRED TO OBTAIN OUR (NATIONAL SECURITY) OBJECTIVES.

IN COMPARING THE COST OF MILITARY HARDWARE, WE PREFER TO SPEAK OF "COST ANALYSIS" RATHER THAN "COST ESTIMATION," BECAUSE THE IDENTIFICATION OF THE APPROPRIATE ELEMENTS OF COST -- THE ANALYTICAL BREAKDOWN OF MANY COMPLEX INTERRELATED ACTIVITIES AND EQUIPMENTS --- IS SO IMPORTANT A PART OF THE METHOD. WEAPONS SYSTEM COST ANALYSIS IS MUCH MORE THAN AN ESTIMATE THAN THE COST OF THE WEAPON ITSELF.

EFFECTIVE PLANNING REQUIRES A FULL UNDERSTANDING OF THE COST ASSOCIATED WITH THE LONG RANGE IMPLICATIONS OF DECISIONS TO ALLOCATE RESOURCES. A DECISION TO PROCURE A GIVEN QUANTITY OF MILITARY HARDWARE CASES CANNOT BE WITHOUT AN OBLIGATION FOR FACILITIES, EQUIPMENTS AND TRAINING OF PERSONNEL, SUPPORT EQUIPMENT AND A HOST OF OTHER RELATED ITEMS, ALL OF WHICH MUST BE ESTIMATED. IN ADDITION, A PROCUREMENT DECISION IMPLIES A DECISION TO INCUR ANNUAL RECURRING COSTS SO LONG AS THE SYSTEM REMAINS IN THE INVENTORY. A FULL IDENTIFICATION OF THE TIMING AND COST OF THESE REQUIREMENTS IS ESSENTIAL TO A FULL UNDERSTANDING OF THE RESOURCES IMPACT OF A GIVEN DECISION.

SO, COST ANALYSIS IS:

"A SYSTEMATIC APPROACH TO THE PROBLEM OF CHOOSING HOW TO EMPLOY SCARCE RESOURCES AND AN INVESTIGATION OF ACHIEVING A GIVEN OBJECTIVE IN THE MOST EFFICIENT AND EFFECTIVE MANNER."

IMPORTANT FACTORS IN THE DAILY WORK OF COST ANALYSIS INCLUDE:

A. ANALYTICAL PERSONNEL ARE TARGETING ON KEY AREAS/PROGRAM OF IMPORTANCE TO THE ARMY AND ARMY AVIATION;

B. WE CONSTANTLY ARE ADDRESSING A COMPLEX MOSAIC OF TASKS FROM MANY FUNCTIONAL AREAS;

C. THAT COST ANALYSIS SUPERVISORS AND TEAM LEADERS ARE CONSTANTLY FACED WITH THE MASTERING OF SUCH PROBLEMS AS LIMITED TIME, MULTIPLE COMMITMENTS, SIMULTANEOUS TASKS AND CONFLICTING PRIORITIES;

D. THAT ALL OF OUR POSITIONS REQUIRE SUBSTANTIAL PROFESSIONAL AND KNOWLEDGE OF MANY PROGRAMS:

E. THAT OUR TRAINING PROGRAM HAS BEEN DESIGNED TO BROADEN AND DEVELOP THE MANAGEMENT KNOWLEDGE BASE, THE PERSPECTIVE, AND THE ANALYTICAL SKILLS OF HIGHLY SPECIALIZED PERSONNEL.

### C. ROLE OF COST ANALYSIS

#### FUNCTIONAL

1. COST ANALYSIS SERVES AS A CONSULTANT TO MANAGEMENT THROUGH THE PROVIDING OF SERVICES DIRECTED TO: (1) COST ESTIMATES TO ASSIST IN THE DECISION MAKING PROCESS AND (2) ANALYSIS OF COST ESTIMATES PREPARED BY OTHER FUNCTIONAL ELEMENTS. EMPHASIS IS PLACED ON ALL PHASES OF THE WEAPON SYSTEM LIFE CYCLE WHICH IMPACT ON THE MATERIEL ACQUISITION PROCESS.

X 2. COST ANALYSIS IS DIRECTED TO FOUR MAJOR FUNCTIONAL THRUST: (1) COST ESTIMATING, (2) REVIEW AND VALIDATION, (3) RESEARCH AND METHODOLOGY AND (4) DATA ANALYSIS. THESE FUNCTIONAL THRUSTS ARE IN TURN FOCUSED TO ESTIMATING AND ANALYSIS AS FOLLOWS:

- COST ESTIMATING -- IN SUPPORT OF BASELINE COST ESTIMATES-- IN SUPPORT OF COEA'S, COST-EFFECTIVENESS STUDIES, SYSTEM ANALYSIS EFFORTS, AND TRADE-OFF DETERMINATIONS -- IN PREPARATION OF IPCE'S FOR MAJOR WEAPON SYSTEMS -- IN PREPARATION OF INDEPENDENT COST ESTIMATES FOR NON-MAJOR WEAPON AND EQUIPMENT SYSTEMS -- IN SUPPORT OF ECONOMIC ANALYSIS EFFORTS FOR BOTH INVESTMENT AND MATERIEL PROGRAM DECISIONS.

- ANALYSIS & VALIDATION -- TO PROVIDE A SYSTEM OF CHECKS AND BALANCES OVER A WIDE RANGE OF RELATED COST ORIENTED MANAGEMENT DOCUMENTS -- TO PROVIDE OBJECTIVE AND INDEPENDENT ANALYSIS OF COST ISSUES -- TO PROVIDE CONSISTENCY AND COMPLETENESS OF ESTIMATES PREPARED BY OTHER FUNCTIONAL ACTIVITIES.

#### MANAGERIAL

1. COST ANALYSIS HAS CENTRALIZED RESOURCES AND EXPERTISE TO PERFORM OR TO PROVIDE DIRECT ASSISTANCE IN THE PREPARATION OF COST ESTIMATES FOR WEAPON SYSTEMS AND MATERIEL PROGRAMS AT KEY MANAGEMENT MILESTONES AND DECISION POINTS. COST ESTIMATING SERVICES ARE APPLIED TO: (1) STUDIES EVALUATING SYSTEM ALTERNATIVES WITHIN THE SYSTEMS ANALYSIS COMMUNITY AND (2) STUDIES OF TOTAL PROGRAM RESOURCES REQUIRED FOR PROJECT MANAGEMENT OF MAJOR WEAPON SYSTEMS.

2. COST ANALYSIS ISSUES GUIDANCE AND DIRECTION TO INSURE CONSISTENT PREPARATION OF ESTIMATES. COST ANALYSIS ASSURES THAT COST DOCUMENTS NORMALLY PREPARED BY OTHER FUNCTIONAL ACTIVITIES IN COMPLIANCE WITH ACCEPTED COST ANALYSIS PRINCIPLES AND ARE REASONABLE IN COMPARISON WITH OTHER INTER-RELATED COST DOCUMENTS.
3. THE COVERAGE IN BOTH THE ESTIMATING AND VALIDATION FUNCTIONS PROVIDES A SYSTEM OF CHECKS AND BALANCES OVER A WIDE RANGE OF MATERIEL ACQUISITION REQUIREMENTS WHICH AFFECT THE ARMY MANAGEMENT PROCESS BUT WHICH MAY NOT BE RECEIVING HQ DA COST ANALYSIS ATTENTION (I.E., NON-MAJOR WEAPON SYSTEMS AND MATERIEL PROGRAMS, FOREIGN MILITARY SALES, ETC.).

#### ORGANIZATIONAL

1. ORGANIZATIONAL PLACEMENT AT ALL LEVELS OF MANAGEMENT IS INFLUENCED BY THE NEED TO MAINTAIN OBJECTIVITY AND INDEPENDENCE FROM THE PROGRAM PROPONENT AND OTHER FUNCTIONAL INTERESTS.
2. WITHIN THIS COMMAND, COST ANALYSIS IS CO-EQUAL WITH SYSTEMS ANALYSIS. THE INTERACTION OF BOTH ORGANIZATIONS PROVIDES FOR A BLENDING OF EXPERTISE FOR MEANINGFUL EVALUATION OF COST AND EFFECTIVENESS CONSIDERATIONS OF PROPOSED WEAPON SYSTEM ALTERNATIVES.

#### PROFESSIONAL

1. THE COSTS ANALYST IS A MULTI-DISCIPLINED PROFESSIONAL WHO EMPLOYS A WIDE VARIETY OF SKILLS AND TECHNIQUES IN SUCCESSFUL ACCOMPLISHMENT OF HIS COST ANALYSIS DUTIES. THE IDEAL COST ANALYST HAS A COMPOSITE OF THE FOLLOWING DISCIPLINES: OPERATIONS RESEARCH, ENGINEERING, ECONOMICS, AND STATISTICS. HE IS QUALIFIED TO WORK WITH ENGINEERS, SCIENTISTS, AND SYSTEMS ANALYSTS ON COST-EFFECTIVENESS AND TRADE-OFF STUDIES DIRECTED TOWARD THE IDENTIFICATION AND SELECTION OF OPTIMAL ALTERNATIVES.

2. THE COST ANALYST IS CONCERNED WITH MAKING RIGOROUS ANALYSES WHICH ASSIST IN THE ARMY MANAGEMENT/DECISION MAKING PROCESS. THE COST ANALYST DEALS WITH IMPRECISE DATA AND MUST PROVIDE FOR RISKS AND UNCERTAINTY. IN ADDITION TO APPLICATION OF ADVANCED SCIENTIFIC AND ANALYTICAL METHODS, HE IS CONCERNED WITH COMPLETENESS AND CONSISTENCY IN TERMS OF DEFINITIONS, FORMAT, COST ELEMENT WBS, AND STANDARDIZED TREATMENT OF THESE FACTORS. THE COST ANALYST MUST REVIEW AND VALIDATE AS WELL AS ESTIMATE; HE IS CONCERNED THAT OTHER FUNCTIONAL ACTIVITIES UNDERSTAND AND APPLY BASIC COST ANALYSIS/COST ESTIMATING PRINCIPLES AND CONCEPTS.

IN AVRADCOM

1. RESPONSIBILITY FOR THE COMMAND'S COST AND ECONOMIC ANALYSIS PROGRAMS, INCLUDE:

(1) DEVELOPING THE PLANS AND PROGRAMS TO ACCOMPLISH THE COST AND ECONOMIC ANALYSIS FUNCTIONS OF THE COMMAND.

(2) CONDUCTING COST AND ECONOMIC ANALYSIS STUDIES, ESTIMATES, AND ANALYSES AIMED AT ASSESSING THE TOTAL RESOURCE IMPLICATIONS FOR ANY UNDERTAKING.

(3) DEVELOPING A COMPREHENSIVE SYSTEM OF ACQUIRING, STORING, VALIDATING AND DISSEMINATING COST DATA TO FORM THE BASIS FOR COST AND ECONOMIC ANALYSES.

(4) DEVELOPING COST ANALYSIS DEFINITIONS, PROCEDURES, AND METHODOLOGY THAT CONTRIBUTE TO HIGH QUALITY COST ESTIMATES.

(5) INTEGRATING THE COST AND ECONOMIC ANALYSIS EFFORTS WITHIN THE COMMAND AND, WHEN APPLICABLE, INSURING INTERCOMMAND COORDINATION OF COST AND ECONOMIC ANALYSES PROJECTS.

(6) PROVIDING OVERALL CONTROL, GUIDANCE AND COORDINATION OF THE COST AND ECONOMIC ANALYSIS PROGRAMS OF SUBORDINATE COMMANDS TO INCLUDE REVIEW AND VALIDATION OF METHODOLOGIES, PROCEDURES COST FACTORS, AND COST ESTIMATING RELATIONSHIPS.

VG #4:

D. GENERAL

1. CONTRACT PRICING IS A TERM WHICH COVERS THREE SEQUENTIAL AREAS. FIRST IS THE ANALYSIS OF EACH FIRM'S PRICE BY USING THE TECHNIQUES OF COST AND/OR PRICE ANALYSIS. SECOND IS THE ESTABLISHMENT OF A PRENEGOTIATION GOAL (TOTAL COST PLUS PROFIT OR FEE; OR TOTAL PRICE) TO BE USED DURING THE ACTUAL NEGOTIATIONS WITH EACH COMPANY. THIRD IS THE ACTUAL NEGOTIATION AND AGREEMENT ON A CONTRACTUAL ARRANGEMENT (PRICE AND CONTRACT TYPE) WHICH COMES AS CLOSE AS POSSIBLE TO THE PRENEGOTIATION GOAL, CONSIDERING BOTH THE ADDITIONAL INFORMATION GAINED DURING NEGOTIATIONS AND THE ABILITY AND WILLINGNESS OF BOTH PARTIES TO COME TO AN AGREEMENT.

2. WHILE ONLY PRICE ANALYSIS IS REQUIRED IN FORMAL ADVERTISING, SOME FORM OF PRICE OR COST ANALYSIS IS REQUIRED IN CONNECTION WITH EVERY NEGOTIATED CONTRACT. THE METHOD AND DEGREE OF ANALYSIS IS DEPENDENT ON THE FACTS OF THE PARTICULAR ACQUISITION SITUATION. COST ANALYSIS SHALL BE PERFORMED WHENEVER IT IS NECESSARY TO REQUIRE THE COMPANY TO SUBMIT COST OR PRICING DATA; HOWEVER, THE EXTENT OF THE COST ANALYSIS SHOULD ONLY BE THAT NECESSARY TO INSURE REASONABLENESS OF THE PRICING RESULT, TAKING INTO CONSIDERATION THE AMOUNT OF THE PROPOSED CONTRACT AND THE COST AND TIME INVOLVED IN THE ACCUMULATION OF THE NECESSARY DATA FOR ANALYSIS. PRICE ANALYSIS SHALL BE USED IN ALL OTHER SITUATIONS TO DETERMINE THE REASONABLENESS OF A PROPOSED CONTRACT PRICE. PRICE ANALYSIS IS ALSO USEFUL IN CONFIRMING THE OVERALL REASONABLENESS OF A PROPOSED PRICE WHERE THE DETERMINATION OF REASONABLENESS WAS DEVELOPED THROUGH COST ANALYSIS. NOTE THAT WHILE PRICE ANALYSIS CAN BE USED TO CORROBORATE THE RESULTS OF COST ANALYSIS AFTER A COST ANALYSIS HAS BEEN COMPLETED, THE REVERSE IS NOT TRUE. COST ANALYSIS IS NEVER USED TO VALIDATE THE RESULTS OF PRICE ANALYSIS. THE REASON FOR THIS IS THAT COST

ANALYSIS IS A MORE TIME-CONSUMING AND ADMINISTRATIVELY COSTLY PROCESS. IF A FAIR AND REASONABLE PRICE CAN VALIDLY BE ESTABLISHED THROUGH THE USE OF PRICE ANALYSIS, THE MORE EXPENSIVE PROCESS OF COST ANALYSIS SHALL NOT BE USED.

3. BASED UPON ITS ANALYSIS OF THE COMPANY'S OFFERED PRICE, THE GOVERNMENT NEXT MUST ESTABLISH ITS PRENEGOTIATION GOAL AS TO WHAT THE GOVERNMENT BELIEVES THE COST, PROFIT, OR FEE SHOULD BE. WHERE PRICE ANALYSIS HAS BEEN USED, THE RESULTS OF THE PRICE ANALYSIS ESTABLISH THE PRENEGOTIATION GOAL. HOWEVER, WHERE THE TECHNIQUE OF COST ANALYSIS HAS BEEN UTILIZED, THE GOVERNMENT AT THIS POINT HAS ONLY ESTABLISHED ITS POSITION ON WHAT THE COST OF CONTRACT PERFORMANCE WILL BE, ASSUMING ECONOMICAL AND EFFICIENT PERFORMANCE ON THE PART OF THE CONTRACTOR. IN ORDER TO DEVELOP A PRENEGOTIATION GOAL, THE GOVERNMENT MUST ALSO CONSIDER THE AMOUNT OF PROFIT OR FEE TO BE ALLOWED CONSIDERING THE COMPLEXITIES AND RISKS INVOLVED IN SUCCESSFUL CONTRACT PERFORMANCE. COST PLUS PROFIT OR FEE EQUALS THE CONTRACT PRICE, AND BASICALLY, IT IS THE PRICE THAT IS TO BE NEGOTIATED. WHERE APPLICABLE, THE TECHNIQUE OF WEIGHTED GUIDELINES SHOULD BE EMPLOYED TO DEVELOP THE GOVERNMENT'S POSITION AS TO PROFIT OR FEE.

4. ONCE THE PRENEGOTIATION GOAL OR OBJECTIVE IS ESTABLISHED, THE GOVERNMENT IS READY TO START THE ACTUAL NEGOTIATIONS. THE PRENEGOTIATION GOAL IS NOT SACRED, HOWEVER. SINCE THE GOAL WAS ESTABLISHED BASED UPON THE FACTS AND FIGURES INITIALLY SUBMITTED BY THE COMPANY, THE GOAL MUST BE CHANGED AS THE FACTS AND FIGURES CHANGE DURING NEGOTIATIONS. THE OBJECTIVE OF PRICE NEGOTIATIONS IS TO ARRIVE AT A FAIR AND REASONABLE PRICE FOR THE WORK TO BE PERFORMED. IT IS NOT THE GOVERNMENT'S OBJECTIVE SIMPLY TO REDUCE THE OFFERED PRICE. THUS, IF THE FACTS AND FIGURES DEVELOPED DURING NEGOTIATIONS INDICATE THAT A HIGHER PRICE THAN THAT DEVELOPED AS A PRENEGOTIATION GOAL WOULD BE FAIR AND REASONABLE, THE GOVERNMENT MUST BE PREPARED TO ADJUST ITS GOAL.

**B. PRICE ANALYSIS:**

1. AS MENTIONED EARLIER, THE DOD PRICING POLICY IS TO ACQUIRE SUPPLIES AND SERVICES AT A FAIR AND REASONABLE PRICE. THE CONCLUSION THAT A PRICE IS FAIR AND REASONABLE MUST BE BASED UPON SOME FORM OF ANALYSIS, EITHER PRICE ANALYSIS OR A COMBINATION OF COST ANALYSIS AND PRICE ANALYSIS, WHERE THE PRICE ANALYSIS IS USED TO VERIFY THE RESULTS OF THE COST ANALYSIS. PRICE ANALYSIS IS THE PROCESS OF EXAMINING AND EVALUATING A PROSPECTIVE PRICE WITHOUT RESORTING TO AN EVALUATION OF THE SEPARATE COST ELEMENTS AND THE PROPOSED PROFIT WHICH TOGETHER MAKE UP THE PRICE. PRICE ANALYSIS IS ALWAYS USED IN CONJUNCTION WITH FORMAL ADVERTISING OR TWO-STEP FORMAL ADVERTISING, SINCE THE PROCEDURES PRECLUDE THE COLLECTION OF DATA NECESSARY TO CONDUCT A COST ANALYSIS. PRICE ANALYSIS CAN ALSO BE USED WITH NEGOTIATED FIXED-PRICE CONTRACTS, AS LONG AS THIS METHOD WILL MEET THE OBJECTIVE OF PRICE ANALYSIS--TO ESTABLISH THAT THE GOVERNMENT WILL BE PAYING A FAIR AND REASONABLE PRICE.

2. PRICE ANALYSIS IS A PROCESS OF COMPARISON. GENERALLY SPEAKING, THERE ARE FIVE COMPARISON ELEMENTS IN THE PROCESS OF PRICE ANALYSIS. THEY MAY BE USED SEPARATELY, BUT MORE OFTEN TWO OR MORE OF THESE ELEMENTS ARE USED IN A PARTICULAR SITUATION: (COMPARE WITH OTHER PRICES SUBMITTED. THIS IS THE MOST COMMONLY USED PROCEDURE, AND CONSISTS SIMPLY OF COMPARING THE PRICE SUBMITTED BY ONE COMPANY WITH THE PRICES SUBMITTED BY ALL OF THE OTHER COMPANIES COMPETING FOR THE PARTICULAR ACQUISITION. THIS PROCEDURE RAPIDLY PINPOINTS THE LOWEST PRICE. HOWEVER, SIMPLY BEING LOW DOES NOT NECESSARILY MEAN THAT THE PRICE IS FAIR AND REASONABLE. IN ORDER FOR THIS PROCEDURE TO DEVELOP A JUSTIFICATION OF A FAIR AND REASONABLE PRICE, IT MUST BE ESTABLISHED THAT THE PRICES SUBMITTED WERE THE RESULT OF ADEQUATE PRICE COMPETITION.)



C. COST ANALYSIS:

1. COST ANALYSIS IS A MUCH MORE COSTLY AND TIME-CONSUMING METHOD TO USE FOR THE DETERMINATION OF A FAIR AND REASONABLE PRICE THAN PRICE ANALYSIS. THUS, IT IS USED ONLY WHERE PRICE ANALYSIS WILL NOT PRODUCE THE DESIRED RESULTS. NOTE, HOWEVER, THAT PRICE ANALYSIS MAY BE USED AFTER THE COMPLETION OF COST ANALYSIS TO VERIFY THE FINDINGS OF THE COST ANALYSIS.

2. COST ANALYSIS IS THE REVIEW AND EVALUATION OF A PROSPECTIVE CONTRACTOR'S COST OR PRICING DATA AND OF THE JUDGMENTAL FACTORS APPLIED BY THE CONTRACTOR IN PROJECTING FROM THE DATA TO THE ESTIMATED COSTS, IN ORDER TO DETERMINE THE DEGREE TO WHICH THE CONTRACTOR'S PROPOSED COSTS REPRESENT WHAT THE PERFORMANCE OF THE CONTRACT WILL COST, ASSUMING REASONABLE ECONOMY AND EFFICIENCY.

A. THIS PROCEDURE INCLUDES THE VERIFICATION OF THE SPECIFIC ELEMENTS OF COST AND THE EVALUATION OF THE SPECIFIC ELEMENTS OF COST. ONCE VERIFIED AND EVALUATED, PROJECTIONS ARE MADE FROM THE DATA TO DETERMINE THE EFFECT ON THE PRICE OF SUCH FACTORS AS:

- (1) THE NECESSITY FOR CERTAIN COSTS.
- (2) THE REASONABLENESS OF THE AMOUNTS ESTIMATED FOR THE NECESSARY COSTS.
- (3) ALLOWANCES FOR CONTINGENCIES.
- (4) THE BASIS USED FOR THE ALLOCATION OF OVERHEAD COSTS.
- (5) THE APPROPRIATENESS OF THE ALLOCATIONS OF PARTICULAR OVERHEAD COSTS TO THE PROPOSED CONTRACT.

B. COMPARISONS SHOULD ALSO BE MADE BETWEEN THE PROSPECTIVE CONTRACTOR'S CURRENT ESTIMATED COSTS WITH:

- (1) ACTUAL COSTS PREVIOUSLY INCURRED BY THE CONTRACTOR.
- (2) THE CONTRACTOR'S LAST PRIOR COST ESTIMATE FOR THE SAME OR SIMILAR ITEMS.
- (3) CURRENT COST ESTIMATES FROM OTHER POSSIBLE SOURCES.

(4) PRIOR ESTIMATES OR HISTORICAL COSTS INCURRED BY OTHER CONTRACTORS MAKING THE SAME OR SIMILAR ITEMS.

C. FORECASTING FUTURE TRENDS IN COSTS FROM HISTORICAL COST EXPERIENCE IS OF PRIMARY IMPORTANCE. IN PERIODS OF RISING OR DECLINING COSTS, AN ADEQUATE COST ANALYSIS MUST INCLUDE SOME EVALUATION OF TRENDS.

3. THE OBJECTIVE OF COST ANALYSIS IS THE SAME AS THAT OF PRICE ANALYSIS--TO ESTABLISH THAT THE GOVERNMENT WILL BE PAYING A FAIR AND REASONABLE PRICE. WHILE PRICE ANALYSIS COVERS ONLY THE ANALYSIS OF TOTAL PRICE, COST ANALYSIS GOES TO MUCH GREATER DEPTH. HERE THE ANALYSIS IS A DETAILED STUDY AND EVALUATION OF ALL THE FACTORS AND JUDGMENTAL DECISIONS THAT WENT INTO THE DETERMINATION OF EACH ELEMENT OF THE TOTAL PRICE.

D. COST OR PRICING DATA:

1. THE COST PROPOSAL SUBMITTED BY A CONTRACTOR CONTAINS A DD FORM 633, CONTRACT PRICING PROPOSAL, WITH ATTACHED SUPPORTING INFORMATION CONCERNING EACH ELEMENT OF COST SHOWN ON THE DD FORM 633. THE DD FORM 633 ITSELF IS THE COST ESTIMATE. THE ACTUAL COST OR PRICING DATA IS THE ATTACHED SUPPORTING INFORMATION WHICH CONSISTS OF FACTUAL INFORMATION WHICH CAN BE VERIFIED. THE COST OR PRICING DATA DOES NOT CONSTRUCT OR VALIDATE THE ACCURACY OF A CONTRACTOR'S JUDGMENT IN ESTIMATING FUTURE COSTS (PROJECTING FROM THE DATA TO THE FIGURES ON THE DD FORM 633), BUT DOES PROVIDE THE BASIS FOR THE CONTRACTING OFFICER'S EVALUATION OF THE CONTRACTOR'S JUDGMENT.

2. SUBMISSION OF COST OR PRICING DATA: THE REQUIREMENT FOR SUBMISSION OF COST OR PRICING DATA IS CONSIDERED TO BE MET WHEN ALL ACCURATE COST OR PRICING DATA REASONABLY AVAILABLE TO THE CONTRACTOR AT THE TIME OF AGREEMENT ON PRICE HAS BEEN SUBMITTED, EITHER ACTUALLY OR BY SPECIFIC IDENTIFICATION IN WRITING. NOTE THAT THIS INVOLVES MORE THAN AN INITIAL SUBMISSION, REQUIRING A CONTINUAL UPDATING OF DATA DURING THE COURSE OF NEGOTIATIONS.

3. IN ORDER TO CONDUCT A COST ANALYSIS, IT IS NECESSARY TO OBTAIN COST OR PRICING DATA FROM THE CONTRACTOR. COST OR PRICING DATA CONSISTS OF ALL FACTS WHICH CAN REASONABLY BE EXPECTED TO CONTRIBUTE TO SOUND ESTIMATES OF FUTURE COSTS AS WELL AS THE VALIDITY OF COSTS ALREADY INCURRED. ADDITIONALLY, BEFORE CONTRACT AWARD, IT IS NECESSARY TO OBTAIN A CERTIFICATION FROM THE CONTRACTOR, THAT TO THE BEST OF HIS KNOWLEDGE AND BELIEF, THE COST OR PRICING DATA THAT HE SUBMITTED WAS ACCURATE, COMPLETE, AND CURRENT AS OF THE DAY NEGOTIATIONS WERE COMPLETED.

E. SUMMARY:

1. PRICE ANALYSIS: A PROCESS OF EXAMINING AND EVALUATING AN OFFERED PRICE WITHOUT RESORTING TO AN EVALUATION OF THE SEPARATE COST ELEMENTS AND PROPOSED PROFIT WHICH COMBINE TO FORM THE PRICE. PRICE ANALYSIS IS A PROCESS OF COMPARISON OF THE OFFERED PRICE WITH OTHER PRICES SUBMITTED FOR THE SAME PRICING ACTION, HISTORICAL PRICES, PRICES ON PUBLISHED PRICE LISTS, PRICES ESTABLISHED BY INDEPENDENT GOVERNMENT ESTIMATES, AND BY USE OF ROUGH YARD STICKS. WHERE IT IS DETERMINED THAT THE PRICE HAS BEEN SET THROUGH ADEQUATE PRICE COMPETITION, OR WHERE THE PRICE IS DETERMINED TO BE AN ESTABLISHED CATALOG OR MARKET PRICE, OR WHERE THE PRICE HAS BEEN SET BY LAW OR REGULATION, IT IS ASSUMED TO BE A FAIR AND REASONABLE PRICE. THE USE OF PRICE ANALYSIS, BEING A LESS COSTLY AND FASTER TECHNIQUE THAN COST ANALYSIS, IS PREFERRED WHERE THIS TECHNIQUE WILL RESULT IN THE DETERMINATION OF A FAIR AND REASONABLE PRICE.

2. COST ANALYSIS: THE REVIEW AND EVALUATION OF A PROSPECTIVE CONTRACTOR'S COST OR PRICING DATA AND OF THE JUDGMENTAL FACTORS APPLIED BY THE CONTRACTOR IN PROJECTING FROM DATA TO THE ESTIMATED COSTS. THE PURPOSE OF COST ANALYSIS IS TO DETERMINE THE DEGREE TO WHICH THE CONTRACTOR'S PROPOSED COSTS REPRESENT WHAT PERFORMANCE OF THE CONTRACT WILL COST, ASSUMING REASONABLE ECONOMY AND EFFICIENCY, AND TO DEVELOP FOR EACH ELEMENT OF COST THE GOVERNMENT'S OWN ESTIMATE AS TO WHAT

CONTRACT PERFORMANCE WILL COST. THIS IS ACCOMPLISHED THROUGH VERIFICATION AND EVALUATION OF EACH ELEMENT OF COST PROPOSED BY THE CONTRACTOR, BASED UPON THE AUDIT AND TECHNICAL ANALYSIS OF THE VARIOUS GOVERNMENT SPECIALISTS. DAR ESTABLISHES THE BASIC CRITERIA FOR THE USE OF COST ANALYSIS BY REQUIRING THE SUBMISSION OF COST OR PRICING DATA FOR ALL NEGOTIATED CONTRACTS AND MODIFICATIONS EXCEEDING \$100,000 (AND IN SOME CASES FOR LESSER AMOUNTS) EXCEPT WHERE THE PRICE IS SET BY ADEQUATE PRICE COMPETITION, A CATALOG OR MARKET PRICE, A LAW OR REGULATION OR WHERE SPECIFICALLY WORRIED BY THE SERVICE SECRETARY. DAR FURTHER REQUIRES THAT, WHERE THE SUBMISSION OF COST OR PRICING DATA ARE REQUIRED AND THE PRICE WILL BE NEGOTIATED BASED UPON COST ANALYSIS, THE CONTRACTOR MUST ALSO EXECUTE A WRITTEN CERTIFICATION THAT THE COST OR PRICING DATA SUBMITTED ARE CURRENT, ACCURATE, AND COMPLETE AS OF THE DAY THE PRICE WAS AGREED TO. THIS CERTIFICATION BINDS THE CONTRACTOR TO THE ACCURACY OF THE DATA, AND, IF AFTER AWARD, THE DATA ARE FOUND TO HAVE BEEN DEFECTIVE AS OF THE DATE OF THE CERTIFICATION, THE GOVERNMENT IS ENTITLED TO A PRICE REDUCTION. THE REQUIREMENTS FOR THE SUBMISSION OF THE COST OR PRICING DATA ARE FULFILLED BY THE SUBMISSION OF A DD FORM 633 CONTAINING THE COST ESTIMATE, WITH DETAILED COST OR PRICING DATA ATTACHED TO SUPPORT EACH ELEMENT OF THE CONTRACTOR'S COST ESTIMATE. THE AUDIT AND ANALYSIS IS BASED UPON THIS DATA, AND BASED UPON THE RESULTS OF THE AUDIT AND ANALYSIS, THE GOVERNMENT DEVELOPS ITS OWN FIGURES FOR EACH COST ELEMENT. THE RESULTS OF THE COST ANALYSIS ARE THE TOTAL OF THE GOVERNMENT'S FIGURES. THIS ESTABLISHES THE GOVERNMENT'S PRENEGOTIATION GOAL ON COSTS, AND PROVIDES THE BASE FOR THE APPLICATION OF THE WEIGHTED GUIDELINES TECHNIQUE TO DETERMINE THE GOVERNMENT'S PRENEGOTIATION GOAL ON PROFIT OR FEE.

VG #6: CHARACTERISTICS OF NEW PROGRAMS

E. THE ELEMENTS AND TECHNIQUES OF COSTING AND PRICING

A. GENERAL. ACQUISITION COSTING ENCOMPASSES COST ESTIMATING, COST ANALYSIS, AND PRICE ANALYSIS. AT CERTAIN MILESTONES THROUGHOUT THE ACQUISITION PROCESS, A DECISION IS TO BE MADE BASED ON THE PROBABLE COST OF THE ACQUISITION (E.G., BETWEEN ALTERNATIVE SYSTEMS, WHETHER TO START PRODUCTION, ETC.). THIS DECISION MUST BE MADE BASED ON THE AMOUNT OF DATA AVAILABLE TO THE ANALYST AT THE MOMENT. A COST ESTIMATING OR ANALYSIS TECHNIQUE PROVIDES THE ANALYST WITH A METHOD TO ARRANGE AND INTERPRET DATA IN A WAY THAT ASSISTS THE ANALYST AND MANAGER MAKING THAT DECISION. BECAUSE OF THE VARIETY OF GOODS AND SERVICES ACQUIRED BY THE GOVERNMENT AND THE QUANTITY AND QUALITY OF INFORMATION AVAILABLE, NUMEROUS TECHNIQUES HAVE EVOLVED. THESE TECHNIQUES RANGE FROM SIMPLE ARRAYING PROCEDURES TO COMPLEX COMPUTER MODELS. THESE TECHNIQUES CAN OPERATE AS LINKS BETWEEN AVAILABLE DATA AND THE DECISIONS. A COST ESTIMATOR OR ANALYST WHO UNDERSTANDS THE BASIC TECHNIQUES CAN CHOOSE THE ONE THAT BEST FORMS THE LINK FOR SPECIFIC CIRCUMSTANCES. THIS MAY BE ACCOMPLISHED BY USING A TECHNIQUE ALREADY IN USE, ADAPTING OR MODIFYING ONE TO FIT A SPECIFIC SITUATION, OR BY DEVELOPING AN ENTIRELY NEW TECHNIQUE. TO SOME EXTENT, EACH ACQUISITION PRESENTS A UNIQUE PROBLEM, BUT A COSTING PROFESSIONAL WILL BE BETTER ABLE TO CHOOSE OR FASHION THE APPROPRIATE TECHNIQUE IF HE IS EQUIPPED WITH A BASIC UNDERSTANDING OF THE VARIOUS APPROACHES TO ESTIMATING AND ANALYSIS.

B. COST ANALYSIS. THE ARMED SERVICES PROCUREMENT REGULATION MANUAL FOR CONTRACT PRICING (ASPM NO. 1) DEFINES COST ANALYSIS AS THE "ELEMENT-BY-ELEMENT EXAMINATION OF THE ESTIMATED OR ACTUAL COST OF CONTRACT PERFORMANCE TO DETERMINE THE PROBABLE COST TO THE VENDOR OF SUPPLYING GOODS AND SERVICES." THE

EXAMINATION AND EVALUATION OF ELEMENTS LOOKS TO SUCH FACTORS AS REASONABLENESS, NECESSITY AND BASIS OF ALLOCATION. BECAUSE IT REQUIRES A PROPOSAL AS A STARTING POINT, COST ANALYSIS IS CONFINED TO THE CONTRACTING AND CONTRACT ADMINISTRATION STAGES OF THE ACQUISITION PROCESS. COST ESTIMATES, FORMULATED WITHOUT ACCESS TO CONTRACTOR SUBMITTED DATA, MAY BE USED AS AN AID OR GUIDE TO AN ANALYST. AN INDEPENDENT ESTIMATE CAN BE USED TO ESTABLISH THE COST REALISM OF THE CONTRACTOR'S SUBMISSION. A LARGE DISCREPANCY BETWEEN AN INDEPENDENT ESTIMATE AND A CONTRACTOR'S PROPOSAL MAY SIGNAL THE COST ANALYST THAT A DEEPER PROBE IS NECESSARY TO RESOLVE THAT DIFFERENCE. THE TECHNIQUE EMPLOYED BY COST ANALYSTS INCLUDE STATISTICAL TECHNIQUES SUCH AS REGRESSION, AUDITING, TREND ANALYSIS, INDEXING AND LEARNING CURVES. THE KEY TO THE APPLICATION OF THESE TOOLS IS FAMILIARITY WITH GOODS AND SERVICES BEING ACQUIRED AND A VALID DATA BASE OF SIMILAR SYSTEMS. A KNOWLEDGE OF U.S. PRODUCTION PROCESSES REQUIRED TO PRODUCE THE ACQUISITION IS INVALUABLE. WHEN A CONTRACTOR SUBMITS PRICING DATA FOR THE LABOR COST OF PRODUCING AN ITEM, TWO FACTORS INVOLVED WILL BE LABOR HOURS REQUIRED AND COST PER HOUR. THE ANALYST CAN EASILY DETERMINE IF THE LABOR RATE IS WITHIN ACCEPTABLE LIMITS, BUT WILL HAVE DIFFICULTY EVALUATING THE PRODUCTION HOURS UNLESS HE IS FAMILIAR WITH THE PRODUCTION PROCESS INVOLVED.

C. PRICE ANALYSIS.

1. PRICE ANALYSIS IS THE PROCESS OF EVALUATING A TOTAL PROSPECTIVE PRICE WITHOUT CONSIDERING THE INDIVIDUAL COST AND PROFIT ELEMENTS OF THAT PRICE. IN A BROADER SENSE, PRICE ANALYSIS IS A TECHNIQUE UTILIZED TO DETERMINE IF ADEQUATE PRICE COMPETITION DOES EXIST. PRICE ANALYSIS IS THE ONLY TECHNIQUE PERMITTED FOR USE IN ACQUISITIONS RESULTING FROM EFFECTIVE PRICE COMPETITION WHICH IN TURN LEADS TO A FAIR AND REASONABLE PRICE. BOTH FORMALLY ADVERTISED ACQUISITIONS AND NEGOTIATED ACQUISITIONS WHERE PRICE REASONABLENESS IS BASED

ON ADEQUATE PRICE COMPETITION ARE EXAMPLES OF CIRCUMSTANCES WHERE ONLY PRICE ANALYSIS TECHNIQUES MAY BE USED.

2. ALTHOUGH CERTAIN CIRCUMSTANCES DICTATE THE USE OF PRICE ANALYSIS EXCLUSIVELY, PRICE ANALYSIS TECHNIQUES MAY BE USED TO SUPPORT OR SUPPLEMENT COST ANALYSIS TECHNIQUES WHEN APPROPRIATE.

3. APPLICATIONS OF PRICE ANALYSIS COULD INCLUDE: COMPARISON OF PRICE QUOTATIONS RECEIVED; COMPARISON OF PRIOR QUOTATIONS WITH CURRENT QUOTATIONS, PROVIDED THE ACQUISITION CIRCUMSTANCES ARE THE SAME OR SIMILAR AND ALLOWANCES FOR CHANGES ARE MADE; THE USE OF ROUGH YARDSTICKS SUCH AS DOLLARS PER POUND; COMPARISON OF PUBLISHED PRICES OF COMMERCIAL ITEMS SOLD IN SUBSTANTIAL QUANTITIES TO THE GENERAL PUBLIC; AND COMPARISON OF PROPOSED PRICES TO INDEPENDENT GOVERNMENT ESTIMATES.

VG #7 }  
VG #7a } JOB COMPARISON

VG #8 }  
VG #8a } FUNCTIONS (%)

VG #9 SSEB INTERFACES

VG #10: (NONE).

VG #11: VEN DIAGRAM

I. CONCLUSIONS

COST ANALYSIS/CONTRACT COST

1. THE COMMAND'S COST ESTIMATING/COST ANALYSIS COMMUNITY IS CURRENTLY SCATTERED IN SEPARATE OFFICES WITH THE TWO COST ANALYSIS DIVISIONS IN THE DIRECTORATE FOR PLANS AND ANALYSIS AND THE COST ECONOMIC INFORMATION SYSTEM (C&EIS) UNDER THE CONTRACT COST AND PRICE ANALYSIS (CC&PA) OFFICES IN THE DIRECTORATE FOR PROCUREMENT AND PRODUCTION. THE INTERFACE BETWEEN THESE ORGANIZATION HAS AT BEST BEEN SPORADIC. PROFESSIONAL SKILLS OF ALL THREE ARE CONSISTENTLY TAPPED FOR FULL-TIME PARTICIPATION OF SOURCE SELECTION EVALUATION BOARDS (SSEB), SHOULD COST STUDIES, DESIGN-TO-COST TEAMS, LONG LEAD TIME ITEMS, COST DATA COLLECTION, ETC. IN ADDITION, THE RESULTS OF THESE EFFORTS, ALL COST ESTIMATES AND ALL ECONOMIC ANALYSES PERFORMED ARE CHanneled THROUGH THE COST ANALYSIS DIVISION'S COST ESTIMATE CONTROL CENTER (CECC). PERSONNEL SKILLS, COMMONALITY OF EFFORT AND TASKS PERFORMED, ARE QUITE SIMILAR IN THE CASE OF THE COST ANALYSIS DIVISIONS AND THE C&EIS OFFICE.
2. CONTRACT PRICING ACTIVITIES MUST ADHERE TO THE CUSTOMS, CONVENTIONS, PROCEDURES, AND REGULATIONS PROMULGATED BY PROCUREMENT AUTHORITIES, AND WORK IN AN INCENTIVE SYSTEM DESIGNED FOR MINIMIZING CONTRACT COSTS. CONTINGENCY ALLOWANCES FOR SUCH FACTORS AS PROGRAM STRETCHOUT, ENGINEERING CHANGE ORDERS, TECHNICAL UNCERTAINTY, FUNDING PERTURBATIONS AND PRICE ESCALATION ARE NOT INCLUDED IN THE NEGOTIATED CONTRACT PRICE.
3. COST ANALYSIS ACTIVITIES, AS DEFINED IN MOST ORGANIZATIONS, ARE NOT CONSTRAINED BY THE DEFENSE ACQUISITION REGULATION, NOR, GENERALLY, BY PRACTICES OF THE PROCUREMENT INSTITUTION. COST ANALYSTS, WHILE AWARE OF THE DESIRABILITY TO MINIMIZE PROGRAM COSTS, HAVE THE RESPONSIBILITY THAT BAD COST ESTIMATES ARE INHERENT TO THE INAPPROPRIATE ALLOCATION OF SCARCE RESOURCES. THUS, COST ANALYSTS WORK UNDER AN INCENTIVE SYSTEM WHICH REWARDS NEITHER MINIMIZING NOR



MAXIMIZING COSTS BUT RATHER FOR DEVELOPING ACCURATE COSTS. AS AN ARM OF PROGRAM MANAGEMENT, IT IS REASONABLE TO EXPECT THAT THE COST ANALYSIS DIVISIONS SHOULD PROVIDE ASSISTANCE IN CONTRACT PRICING; HOWEVER, WITH THE PREPONDERANCE OF CONTRACT AND PRE-CONTRACT PRICING ACTIVITY AIMED AT MINIMIZING COSTS, THE DIVISION PROVIDES ASSISTANCE AS AN APPROPRIATE COUNTER TO WHAT MIGHT BE TERMED "THE PHENOMENON OF DOWNWARD BIAS" IN COSTING WITHIN OUR PROCUREMENT PROCESS. FOR THIS REASON, COORDINATION AND INTERCHANGE OF INFORMATION BETWEEN THE COST AND PRICE ANALYSTS ARE BENEFICIAL; COORDINATION, HOWEVER DOES NOT DEMAND THE VARIANCE BETWEEN COST ESTIMATES AND (THE BUDGET PROCESS BE ACCOUNTED FOR IN PRICING TERMS). TO DEMAND SUCH A RECONCILIATION WOULD BE A MISTAKE BASED ON A MIS-UNDERSTANDING OF THE SEPARATE NATURE OF THE TWO ACTIVITIES INVOLVED.

4. THE TOOLS OF COST ANALYSTS ARE GENERALLY DIFFERENT FROM THOSE OF CONTRACT PRICING SPECIALIST, AS IS THE MATERIAL WITH WHICH EACH GROUP WORKS. COST ANALYSTS USE AGGREGATE DATA GENERALLY BASED ON THE FINAL COSTS OF OTHER RELEVANT PROGRAMS. PRICING ANALYSTS USE DETAILED DATA FROM A CONTRACTOR'S PROPOSAL FOR A SPECIFIC PROGRAM. THEREFORE, CONTRACT PRICE DATA PROVIDE THE PROJECT MANAGER AND COST ANALYSTS WITH A VALID CHECK ON THE ACCURACY OF THE ESTIMATE AND THE HISTORICAL DATA BASE.

5. OVERALL, THE CONSTANT NEED TO IMPROVE THE COST ESTIMATES OF MAJOR SYSTEMS ACQUISITION HAS BEEN APPARENT AND EMPHASIZED FROM THE SUCCESSION OF COST OVERRUNS, CLAIMS, CONTESTED AWARDS, BUY-INS, BAIL-OUTS, AND DEFECTIVE SYSTEMS/SUBSYSTEMS THAT HAVE DRAWN CRITICISM TO MANY AIRCRAFT PROGRAMS IN RECENT YEARS. THIS EMPHASIS CREATES A NECESSITY FOR THE ESTABLISHMENT OF AN ORGANIZATIONAL FRAMEWORK FOR CONDUCTING AND CONTROLLING ACQUISITION PROGRAMS TO HIGHLIGHT THE KEY "COST DECISION" AREAS. THERE ARE MANY HIGH COMMAND-LEVEL ACTIONS AND DIRECTIVES THAT WOULD ESTABLISH EFFECTIVE COST CONTROL OVER THE SYSTEM ACQUISITION PROGRAM. A REALIGNMENT AND EXPANSION OF THE COST ANALYSIS STRUCTURE

IS REQUIRED FOR A CLEARER UNDERSTANDING OF THE NECESSITY FOR COST CONTROLS IN THESE PROGRAMS. EXAMPLES OF THE CONTINUOUS HIGH COMMAND LEVEL ATTENTION ARE FOUND IN THE ACTIONS/DIRECTIVES/GUIDANCE ON SUCH THINGS AS THE DOD COST ANALYSIS IMPROVEMENT GROUP (CAIG), DESIGN-TO-COST, SHOULD COST, ECONOMIC ANALYSIS, BASELINE COST ESTIMATES, INDEPENDENT PARAMETRIC COST ESTIMATES FOR ASARC AND DSARC, TRACE, ETC.

6. ALTHOUGH THERE HAS BEEN NO DUPLICATION OF STUDY EFFORTS BY THESE SEPARATE ORGANIZATIONAL ENTITIES, THE COLLECTION OF COST DATA AND THE RESEARCH EFFORTS ASSOCIATED WITH THE EXPERIMENTATION AND APPLICATION OF NEW OR UNTRIED COST ESTIMATING TECHNIQUES IS SIMILAR. IN ADDITION, SIMILAR PERSONNEL SKILLS INCLUDE OPERATIONS RESEARCH ANALYSTS, MATHEMATICIANS, STATISTICIANS, ECONOMIST, PROGRAM ANALYSTS, AND INDUSTRIAL ENGINEERS. THE CONSOLIDATION OF THESE ANALYTICAL SKILLS, IN THEIR OWN PECULIAR AREA(S), FOR CONTINUOUS AND CONCERTED EFFORTS CAN RESULT IN MORE PROFESSIONALLY-ADEQUATE RESPONSES TO THE DEMANDS OF HIGH PRIORITY ARMY PROGRAMS AS WELL AS THE:

A. EXPANSION AND IMPROVEMENT OF THE CONTENT OF THE EXISTING COST ANALYSIS DATA BASE TO INCLUDE THE DEVELOPMENT OF A DETAILED CONTROL AND COST TRACKING SYSTEM FOR ALL AIRCRAFT SYSTEMS.

B. CONTINUATION OF THE IMPROVEMENT OF COST METHODOLOGIES, ESTIMATION TECHNIQUES, AND PRESENTATION FORMATS.

C. FULL OPERATIONAL DESIGNATION AS THE FOCAL POINT FOR ANALYTICAL ACTIVITIES BY COORDINATING AND EVALUATING ANALYTICAL STUDIES.

D. DEVELOPMENT OF DATA AND PREDICTIVE TECHNIQUES NEEDED TO MEASURE THE "TOTAL ECONOMIC COST" CONSIDERS THE COST OF THE PRODUCT, COST OF THE SUPPORT SYSTEM, AND COSTS ARISING THROUGH USE AND DISPOSAL OR CONSUMPTION. IDEALLY, ALL COSTS ULTIMATELY INCURRED BY THE GOVERNMENT ARE BROUGHT TO BEAR ON THE PROCUREMENT SUPPORT DECISION. BY CONSIDERING THE TOTAL ECONOMIC COSTS OF

VARIOUS ALTERNATIVES, THE ARMY CAN INSURE THAT SYSTEMS/SUBSYSTEMS ARE ACQUIRED WITH OPTIMUM ECONOMY AND EFFECTIVENESS.

E. COST OF IN-HOUSE PERFORMANCE IN MANY ORGANIZATIONAL AREAS. THE OVERALL CONCERTED EFFORTS OF THESE SKILLS WOULD PROVIDE STRONGER INTERFACES AND STRENGTHEN CAPABILITIES WITH THE LABORATORIES AND IN THE AREAS OF COST ESTIMATING AND ECONOMIC ANALYSIS:

(1) DEVELOPING LIFETIME OWNERSHIP COSTS FOR SELECTION OF MODIFICATION OF MAJOR AIRCRAFT SYSTEMS.

(2) DEVELOPING TOTAL COST PROJECTIONS FOR THE NUMBER AND KIND OF SYSTEMS TO BE BOUGHT FOR OPERATIONAL USE.

(3) PREPARING ESTIMATES FOR FINAL DEVELOPMENT AND PROCUREMENT.

(4) CONDUCTING AND SPONSORING RESEARCH IN COST ANALYSIS/ESTIMATING POLICY PROCEDURES AND PREDICTIVE TECHNIQUES.

(5) ESTABLISHING AND MAINTAINENCE OF A CENTRAL COST ESTIMATING REPOSITORY AND RESEARCH LIBRARY.

(6) MAINTAINING LIAISON WITH PROFESSIONAL ORGANIZATIONS, WITH PARTICIPATION IN DOD AND OTHER INTERGOVERNMENTAL CONFERENCES AND RELATED ACTIVITIES.

(7) CONTINUING REVIEW OF ALL ACQUISITION, DOCUMENTS, AS WELL AS THOSE WITH A PURPOSE OF SHOWING PROGRAM FINDING.

7. ADDITIONAL BENEFITS CAN BE EXPERIENCED IN THE FOLLOWING AREAS:

A. FULL UTILIZATION OF DATA, ANALYSES, AND EXPERIENCE OF EACH ACTIVITY.

B. DEVELOPMENT OF A COMMON COST DATA EASILY ACCESSIBLE THROUGHOUT THE COMMAND TO MAXIMIZE COMPARABILITY OF DATA.

C. ESTABLISHMENT OF CRITERIA FOR CONSISTENT WEAPON SYSTEM ESTIMATES WITHIN THE COMMAND.

D. REVIEW OF TECHNICAL COST ANALYSIS PROBLEMS AND SPECIFYING PROCEDURE GUIDANCE AS APPROPRIATE.

E. IDENTIFICATION OF THE NEED FOR ADDITIONAL EFFORTS AS WELL AS THE ELIMINATION OF UNNECESSARY DUPLICATION IN DOD-WIDE COST RESEARCH.

F. PROVIDE TECHNICAL SUPPORT IN THE IDENTIFICATION OF COST SIGNIFICANT SUBSYSTEMS AND CHARACTERISTICS DATA THAT SHOULD BE REPORTED.

G. INCREASED QUALITY OF WORK.

H. INCREASED DEPTH OF WORK.

I. INCREASED EXPERTISE AND CAPABILITY OF RESPONSE.

J. INCREASED FLEXIBILITY.

K. LESS INCREMENTAL EFFORT.

8. IN SUMMARY, IT <sup>(has been)</sup> IS RECOMMENDED THAT THESE ORGANIZATIONS WITHIN THE DIRECTORATE FOR PROCUREMENT BE RESTRUCTURED WITHIN THE DIRECTORATE FOR PLANS AND ANALYSIS AND THAT THERE BE APPROPRIATE INCREASE IN AUTHORIZED MANPOWER ALLOCATIONS AND GRADE LEVELS.

9. COMPUTER MODEL DEVELOPMENT ADVANTAGES

A. SOLVING PROBLEMS THROUGH COMPUTER SUPPORTED APPLICATIONS OF SYSTEMS ANALYSIS, MANAGEMENT SCIENCES, AND OPERATIONS RESEARCH TECHNIQUES.

B. USING TABULAR AND GRAPHICAL DESIGN TECHNIQUES FOR AUTOMATED MANAGEMENT INFORMATION DISPLAYS.

C. DESIGN, DEVELOP, OPERATE AND MAINTAIN APPLICATIONS PROGRAMS AND ADVANCED SOFTWARE SYSTEMS FOR ASSIGNED SYSTEMS AND MODELS.

D. FURNISH PROCESSED INFORMATION DISPLAYS AND REPORTS IN THE FORMAT AND FREQUENCY DETERMINED BY PROPONENT ACTIVITIES.

E. MAINTAIN A COMPUTATIONAL DATA BANK AND RELATED SYSTEMS INTERFACE TO PROVIDE STUDIES, REPORTS AND REAL-TIME INTERACTIVE DISPLAYS FOR ANALYSIS, ESTIMATES, AND PROGRAM DEVELOPMENT.

F. IT IS ENVISIONED THAT THIS RESTRUCTURING OF RESOURCES WILL EXPEDITE THE ELIMINATION OF DATA ERRORS, DATA INCONSISTENCIES AND THE MAJOR DATA GAPS. FACED WITH NEW ADVANCED STATE-OF-THE-ART SYSTEMS, IT IS NECESSARY TO BRING ABOUT A COMMON MEASURE OR ADJUSTMENT OF AT LEAST LIMITED HOMOGENEITY TO THE DATA BASE AND TO THE AIRCRAFT SYSTEM UNDER STUDY.

VG #12: RATIONALE FOR COMBINING ANALYTICAL EFFORT

VG #13: SUMMARY, ARMY ROLE, CA/PA

#### CONCLUSION

THE OBSERVED DIFFERENCE IN THE ACTUAL JOB DIFFERENCE HAS BEEN EXAMINED ON BY COMPARING THE FUNCTION STATEMENTS OF BOTH GROUPS. ALTHOUGH THE FUNCTION STATEMENTS READ QUITE SIMILAR IN SOME AREAS, EXPERIENCE AND "EVOLUTION" OF DUTIES HAS DRAWN RATHER SHARP DISTINCTION BETWEEN THE TWO GROUPS AS IDENTIFIED AS EITHER PRICE OR COST ANALYSTS. WE HAVE ESTIMATED THE PERCENT OF COMMAND EFFORT IN THE FUNCTIONS SHOWN AS A METHOD TO DESCRIBE THIS DISTINCTION.

IN SUMMARY, COSTING AND PRICING REQUIREMENTS ARE NOT THE SAME THROUGHOUT THE ACQUISITION PROCESS. PLANNING, BUDGETING, AND CONTRACTING DECISION CRITERIA PLACE SUBSTANTIALLY DIFFERENT DEMANDS ON COST AND PRICING ESTIMATES. THE NEEDS FOR ACCURACY, TIMELINESS, AND COMPLETENESS VARY FOR ESTIMATES USED IN MAKING ACQUISITION PROCESS DECISIONS.

IT IS THEREFORE USEFUL TO ASSOCIATE COST AND PRICING ESTIMATES AND THEIR ASSOCIATED TOOLS WITH THEIR RESPECTIVE TIME PHASE IN THE ACQUISITION CYCLE AND DECISION APPLICATION.

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EXAMPLE: COST/PRICE FUNCTION COMPARISON

Comparison of Cost Analysis and Contract Cost Office

Computer Programs of Bell Helicopter Company Accounting System

1. Background. Cost Analysis was assigned to update a computer program of the Bell Helicopter Company accounting system to incorporate recent changes in the Bell accounting system. The Contract Cost Office currently has two computer programs of the Bell accounting system, a large program which is run in batch mode and a small program which is run in Time Sharing Option (TSO) mode. The batch program was sent to the Contract Cost Office by Bell. The TSO program was adapted from the batch program.
2. Commonality. Both offices have computer programs containing equations which describe the Bell Helicopter Company accounting system. The programs calculate total cost for a Work Breakdown Structure (WBS) item from inputs of manhours, labor rates and overhead rates.
3. Differences. Basically, the differences relate to the level of detail involved in the programs.

a. The following table lists the inputs to the Cost Analysis Division program and the inputs to the Contract Cost Office programs:

<u>Cost Analysis</u>	<u>Contract Cost Office</u>
Quality assurance labor manhours	Final assembly labor manhours
Total manufacturing labor manhours	Manufacturing labor manhours
Tool make labor manhours	Tool make labor manhours
	Manufacturing engineering labor manhours
Total engineering labor manhours	Engineering test and evaluation labor
	manhours

SUBJECT: Comparison of Cost Analysis Division and Contract Cost Office  
Computer Program of Bell Helicopter Company Accounting System

Cost Analysis

Contract Cost Office

	Engineering design labor manhours
	Engineering pilot staff labor manhours
	Program management labor manhours
	Technical publications labor manhours
	Spares engineering labor manhours
	Photographic labor manhours
Service representative labor manhours	Service representative labor manhours
Total offsite labor manhours	Offsite labor - manufacturing manhours
	Offsite labor - tooling manhours
	Offsite labor - manufacturing engineering manhours
	Offsite labor - logistics manhours
	Offsite labor - engineering manhours
Total manufacturing material cost	Raw material cost
	Vendor material cost
Engineering material cost	Engineering material cost
Total tool material cost	Tool material cost
Purchased equipment cost	Outside production cost
	Outside production direct - Amarillo cost
	Outside production - tool cost
	Outside production - nonrecurring cost
Subcontract cost	Procured subsystem cost
Total other direct charges	Direct expense - other cost
	Direct expense - insurance cost
	Direct expense - travel cost

b. The Cost Analysis program calculates costs for one time period, which may range from one year to the entire length of the contract. The Contract Cost Office batch program calculates costs for each year of a contract and sums the costs over the entire length of the contract. The Contract Cost Office TSO program is capable of calculating costs for one WBS item for each of four years and summing the costs over the four years.

c. The Cost Analysis program calculates costs for up to eight fourth level WBS items within 18 third level WBS items within eight second level WBS items and summing the cost up to third level and second level. The Contract Cost Office batch program calculates costs for up to 300 WBS items at any level and sums the costs to higher level WBS items. The Contract Cost Office TSO program is capable of calculating costs for one time period for each of four fourth level WBS items and summing the costs to one third level WBS item.

d. The Cost Analysis program output displays contractor estimated costs and government estimated costs. The Contract Cost Office batch program output displays contractor costs, government costs, and the differences between the two. The Contract Cost Office TSO program output displays either contractor costs or government costs but not both in the same run.

4. Advantages/Disadvantages. The Cost Analysis program is suitable for calculating costs for independent cost estimates performed using an engineering manhours buildup approach. This type <sup>of</sup> ~~to~~ cost estimating provides a level of detail compatible with the input requirements of the program. The program can also be used in contract negotiations, as it was for the AAR SSEB. The Contract Cost Office computer programs deal with a level of detail usually reached only during negotiation of a contract. The batch program could also be used for independent engineering-type cost estimates,



but it is larger and requires more running time than is necessary for this purpose. On the other hand, the TSO program is too small to be used for this purpose. The Contract Cost Office programs have the advantage of one-to-one correspondence to each cost element in the Bell accounting system. This helps to prevent misunderstandings of what is included in each cost element.

## ROLE OF COST ANALYSIS IN DOD

1. Organizational Impacts in Cost Analysis examined and compared the cost analysis programs of the individual Services and, within each Service, the cost analysis hierarchy. It was observed that the specific functions and organizational location was a function of both attitudes and philosophy on such issues as:

- . Need for independence in estimating and validating.
- . Layering (duplication vs having a check and balance).
- . Responsiveness (quick turn-around time) on management questions.
- . Need for standardization/consistency in costing.
- . Availability and best use of resources.

2. Cost Analysis Role in Source Selection discussed the types of specific cost analysis activities undertaken in the course of source selection. Among these were:

- . Developing the most probable cost to the Government.
- . Validating the flyaway cost objective.
- . Establishing the format, methods and approach used in source evaluations.

Discussions included the respective roles of the cost analyst and price analyst. A consensus developed that the two fields should not be merged because of basic differences in

- . Required training.
- . Outlook (Macro vs Micro).
- . Function (Managerial vs Contractual).

3. Role of the Cost Analyst considered professional conduct. Are cost analysts placed in advocate positions? The consensus was that cost analysts are and must remain objective and that this is not inconsistent with an adversary role.

The analogy of the legal profession was given to sustain the argument that one can be both objective and an adversary. It is an issue of quality of evidence and manner of presentation. There was a consensus on the need for professional standards for cost analysis.

4. Skill and Knowledge Training in the Cost Analyst's Career provided insights as to

- . The spectrum of knowledge required of a cost analyst.
- . Available courses and where shortfalls exist.
- . The need and ways to match individuals to jobs and to training needs.
- . One specific system exhibiting a disciplined approach to identifying current skills and knowledge and shortfalls.

5. Cost Analysis and the CAIG covered expectations of the CAIG with respect to cost presentations made by the Services. In addition to reviewing the general requirements discussion was pointedly focused on the following needs:

. Emphasis on analysis underpinning the numbers more than simple presentation of numbers.

- . Sensitivity of estimates to changed assumptions.
- . Involvement of both the baseline (BCE) estimate and the independent (IPCE) estimate in a comparative analysis.

6. Cost Analysis in a Field Activity stressed the myriad activities of the cost analyst in field offices. A major point was that major weapon system IPCE activities probably account for less than 10% of the field's cost analysis activities. Major efforts were expended in fulfilling the role of devil's advocate for the local commander. Three broad areas wherein this role was played were identified as:

- . Cost data analysis and validation for a variety of cost estimates including budget/programming estimates.

- . Foreign Military Sales (FMS) cases.

- . Economic Analyses.

7. Cost Analysis in the Federal Contract Research Centers (FCRC's also called think-tanks) traced the evolution of cost analysis in the think-tanks covering the rise and decline of such activities. The severe cuts in cost analysis spaces since the late 1960's had led to a project orientation with little, if any, new cost research being performed. Current FCRC cost activities are "living off of yesterday's capital." The concern surfaced that there should be resources set-asides in the FCRC's for the explicit purpose of contributing to advancing the state-of-the-art in costing through performing cost research.

8. Cost Analysis Role in Industry developed the perceptions that Government and industry cost analysts have much in common, professionally. The industry cost analyst, has responsibilities in two broad areas:

- . Supporting the customer (DOD)
  - Developing cost estimates
  - Supporting trade-off studies
- . Supporting Management
  - Costing alternatives
  - Providing IR&D program cost estimates
  - Contributing to the company planning and budgeting process.

A consensus developed that a great need exists for an appropriate forum where Government and industry cost analysts can communicate on a professional plain.

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DIRECTORATE FOR PLANS AND ANALYSIS  
POINT PAPER

Aug 1981

ALL PROFESSIONAL COST ANALYST POSITIONS GS-5/15

DESCRIPTION OF WORK

Cost analysts perform professional work and provide professional consultation requiring --

- \* Research into causal relationships between costs and products produced and services rendered.
- \* Analysis and interpretation of cost impact of economic phenomena such as performance/design specifications; and program requirements, such as quantities of people and products.
- \* The construction and use of specialized tools of analysis such as mathematical models.
- \* The employing of techniques for quantifying, measuring and understanding the costs associated with alternative courses of action.
- \* The writing and reporting of cost analyses, economic analyses and cost/benefit analyses.
- \* The verbal presentation of cost findings and supporting evidence to decisionmakers.

Specificall, cost analysts in the positions covered by this series collect and evaluate information and technical and economic reprotos for their contribution to an understanding of costs and cost driving variables associated with past, present and proposed plans and programs. The cost analyst must be equally versed in the rigorous methods of scientific inquiry and analysis and in the subject matter of the problem. The cost analyst must be mult-disciplinary.

## DIRECTORATE FOR PLANS AND ANALYSIS

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Use of Computerized Cost Models in Cost Analysis

The advantages of using cost models in studies of large, complex multi-million dollar systems are derived primarily from the inherent requirements in model development and computer programming. Since the computer must have a precise description of the cost estimating methodology and the system being studied, the formulation of the system in terms of both cost and design evolves from nebulous description to explicit specifications and definitions. The tasker is, therefore, provided with costs for explicit system configurations, and areas of sensitivity in terms of cost or effectiveness can be related to specific parameters in the design of the system. While a cost model will not make a decision, it will permit the tasker to base his conclusions upon logically sound cost information derived from an explicit definition of the system and the cost methodology employed.

A cost model can be defined as a deterministic type model combining the technique and elements of cost analysis into a unified and consistent structure. It is neither stochastic nor a simulation of a process. It evaluates resource requirements expressed in manpower and dollars, but it does not determine military effectiveness. Such a model consists of explicit definitions for each element of cost pertinent to the system. These definitions are made in terms of the Cost Estimating Relationship (CER) which is any combination of parametric equations, judgement factor, or a cost factor.

There are many types of cost models in existence today. Such models can be divided into three general levels as shown below. A level one model considers the cost effectiveness of the total force structure and as such would be used for planning the overall compositions of the systems. Level one consists of those

models which prepare cost projections for many systems. These models are primarily concerned with the economic interaction of all significant military systems. They accept as part of their cost input the results obtained from cost models developed for individual weapon systems. The individual system models, known as life-cycle models, are level two models which compute cost estimates for a particular system in the three cost categories: Development, Investment, and Operating. Operating cost is usually computed on an annual basis for a given period of time, generally, fifteen or twenty years. Level two models utilize the results of the models for each of the three cost categories to determine the complete life cycle cost, considers system production rates and phase in, weapon system effectiveness, and the force structure within the system. Level three models are used to derive specific costs and to accomplish detail system cost trade-offs studies in three major categories: Development, Investment and Operating. These models may operate either independently or as subroutine within a level two model.

The advantages of using computerized cost models include the documentation of cost estimates that has often proved to be a time-consuming task. Through the use of the computer, this problem has been substantially reduced. The computer program provides a written description of the estimating methodology employed, the input records the description of the system, and the printout of the results records the cost evaluation of the system being studied. Another advantage of computer models is the obvious one. It relieves the Cost Analysis staff of the burden of repetitive time-consuming calculations. Not only can rapid response requirements for cost data be met, but also, the analyst can present costs for many reasonable alternatives, including areas of sensitivity, and perhaps point out potential problems not readily apparent to the decision maker. Cost Models enable the analyst to study the sensitivity of various parameters to

the resources required by the system. Design cost trade-off studies providing significant cost information on the various feasible system configurations are possible, and cost for varying degrees of effectiveness can be easily determined for application in cost effectiveness studies. In addition, studies can be conducted to ascertain the cost sensitivity of various system parameters or specifications, thereby focusing the attention of the decision maker directly on sensitive areas where potential problems may develop.